

## SHORT COMMUNICATION

**Two new species of *Hibbertia* (Dilleniaceae) from Western Australia**

Two new species of *Hibbertia* Andrews (Dilleniaceae) have been resolved among collections in the Western Australian Herbarium during an assessment of material previously included in a broadly circumscribed *H. helianthemoides* (Turcz.) F.Muell. Both had previously been included in an informal taxon segregated as *H. sp.* Geraldton Sandplains (R. Edmiston E 421); they belong in *Hibbertia* subgen. *Hibbertia*, but are probably not closely related.

***Hibbertia pubens*** K.R.Thiele, *sp. nov.*

*Type*: 1.2 km west of the Brand Highway on Cooljarloo Road, c. 8 km direct line north-west of Cataby, Western Australia, 10 December 2017, K.R. Thiele 5448 (*holo*: PERTH 08926158; *iso*: AD, CANB, MEL).

Low *shrubs* 0.2–0.3(–0.45) m high, the stems erect at first, later sprawling, resprouting from a stout taproot after fire; branchlets with a moderate to dense indumentum of fine, white, curled, simple hairs sometimes overlain by longer, straighter ones; older stems with pale brown, papery bark decorticating in strips. *Leaves* spreading, scattered or clustered at the apices of short-shoots, linear, (10–)15–25(–35) mm long, (1.3–)2–4(–5) mm wide, the margins distinctly but usually loosely recurved and not obscuring the undersurface, the midrib moderately thickened abaxially; adaxial surface smooth, tardily glabrescent, with sparse to moderate, white, curled to flexuose, simple hairs 0.4–0.8 mm long when young, denser and straighter on the margins towards the leaf base; abaxial surface persistently pubescent with moderate to dense, white, curled, simple hairs to 0.2 mm long, the midrib with longer, straighter hairs like the adaxial surface; apex obtuse. *Flowers* sessile, solitary or few-clustered at the ends of short-shoots, closely subtended by the upper leaves; flower-subtending bract herbaceous, linear to narrowly oblong, 3–7 mm long, obtuse, with indumentum as for the leaves. *Sepals* 5, broadly ovate, slightly attenuate to a blunt apex, 7–9 mm long, abaxially moderately to densely pubescent with short, white, curled to flexuose, simple hairs, adaxially glabrous; midribs not prominent; outer and inner sepals similar in size, apex shape and indumentum but the inner ones broader and with glabrous margins. *Petals* 5, yellow, broadly obovate, 9–12 mm long, obscurely emarginate. *Stamens* (15–)18–25(–39), in 5 bundles around the gynoecium, usually with 3 or 6 stamens per bundle (sometimes as few as 2 or as many as 10); most stamens fused by their filaments as far as the anther, the innermost usually free almost to the base; filament bundles c. 1.5 mm long; anthers rectangular, c. 2 mm long, dehiscent by introrse, longitudinal slits. *Staminodes* absent. *Carpels* 3; ovaries compressed-globular, glabrous; styles spreading excentrically from the carpel apex, c. 3.5 mm long. *Ovule* 1 per carpel. *Fruiting carpels* and seeds not seen.

*Diagnostic features.* *Hibbertia pubens* may be distinguished from all other Western Australian taxa by its combination of stamens in 5 bundles united by their filaments and surrounding the 3 glabrous carpels, and linear to narrowly elliptic leaves with loosely recurved margins and an abaxial indumentum of short, white, curled hairs.

*Other specimens examined.* WESTERN AUSTRALIA: 15 km SE of Eneabba, 20 Oct. 1979, *R.J. Cranfield s.n.* (PERTH); 15 km SE of Eneabba, 23 May 1980, *R.J. Cranfield* 1445 (PERTH); 26 km W of Badgingarra, 18 Dec. 1995, *R. Davis* 423 (PERTH); 300 m along Woolka Road from junction with Brand Highway, c. 9 km N of Cataby, 2 Dec. 2002, *R. Davis* 10542 (PERTH); Alexander Morrison National Park, 22 Nov. 1978, *E.A. Griffin* 1754 (PERTH); 15 km S of Eneabba on Brand Highway, 24 Feb. 1981, *E.A. Griffin & M.I. Blackwell* 2825 A (PERTH); near Mullering Brook, 25 Feb. 1971, *B.R. Maslin s.n.* (PERTH); Rose Thompson Road, E of Eneabba, 14 Nov. 2007, *C. Godden* EM 05-03 (PERTH); near E border of Nambung Nature Reserve, region of Mullering Brook, 29 Nov. 1974, *R. Pullen* 9723 (CANB, PERTH); South Eneabba Nature Reserve, 20 Nov. 2007, *B. Taylor & K. Greenacre* P2-111-02 (PERTH); Cooljarloo Road, N of Cataby, 1 Jan. 2017, *K.R. Thiele* 5420 (PERTH).

*Phenology.* A late-flowering species, recorded flowering between October and February, probably peaking in late November and early December, with outlying records in May and July.

*Distribution and habitat.* Distributed between the vicinities of Eneabba and Cataby in the Lesueur Sandplain sub-bioregion of the Geraldton Sandplains IBRA bioregion, mostly along or close to the Brand Highway, with a slightly more easterly collection from Alexander Morrison National Park (Figure 1A). Occurs on white or grey sandplains over laterite, in *Banksia*-dominated kwongan heaths often with *Eucalyptus todtiana* and *E. drummondii*.

*Conservation status.* *Hibbertia pubens* is represented in the Western Australian Herbarium by nine specimens distributed in an area c. 90 km × 35 km. Some collections are within nature reserves and national parks, while others are on roadsides and adjacent to sand-mining operations. While it is not currently considered to be at risk, much of the area where it occurs has been cleared for agriculture or is prospective for mineral sands. Many *Hibbertia* species, especially lignotuberous ones such as *H. pubens*, are considered 'recalcitrant' in post-mining revegetation projects due to low seed set and strong inhibition of germination (Schatral *et al.* 1997). This species should be considered when assessing impacts of mining operations.

*Etymology.* The epithet is from the Latin *pubens* (pubescent), in reference to the distinctive indumentum of short, curled hairs on the abaxial leaf surface, which serves to distinguish it from superficially similar taxa.

*Affinities.* The relatives of *H. pubens* are unknown. It superficially resembles *H. huegelii* (Endl.) F.Muell. *s. str.* (see Thiele 2017), *H. sericosepala* K.R.Thiele and *H. leucocrossa* K.R.Thiele, differing from the first in having loosely rather than tightly recurved leaf margins, from the second in having a sparse, appressed, curled rather than dense, spreading-pilose indumentum on the sepals, and from the last in having sparsely pilose, non-glaucous leaves without a distinct basal fringe. From all three it differs in the distinctive persistent, short, white, curly hairs on the abaxial leaf surface (*cf.* glabrous in the other three species). *Hibbertia desmophylla* (Benth.) F.Muell. may also be related, but that differs in having shorter, distinctly fascicled leaves with a sparse pilose indumentum of more or less straight hairs on the abaxial leaf surface, and usually glabrous sepals.

*Notes.* Overall indumentum is somewhat variable in many species of *Hibbertia*. In general, juvenile plants and young growth are more hairy than adult plants and mature growth, with elements of the juvenile and/or young-growth indumentum variably persisting. However, the abaxial leaf lamina indumentum appears in many cases to be relatively invariant, and hence is a strong character for species

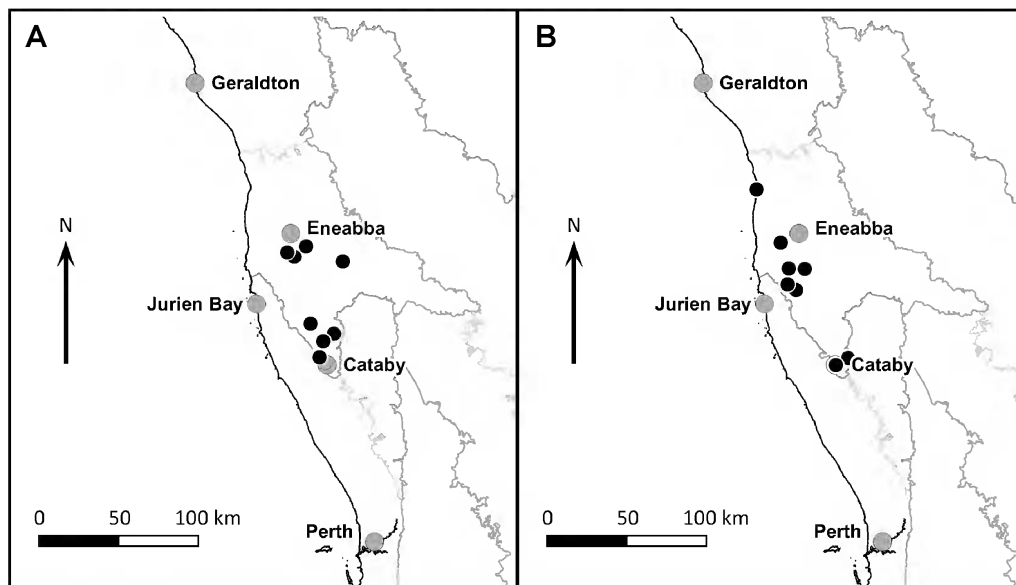


Figure 1. Distribution of A – *Hibbertia pubens* and B – *H. squarrosa* in the Lesueur Sandplain sub-bioregion of the Geraldton Sandplains IBRA bioregion of Western Australia. IBRA7 boundaries (Department of the Environment 2013) shown in grey (bioregions) and light grey (sub-bioregions).

delimitation and identification. In the case of *H. pubens*, the abaxial indumentum is highly consistent, and clearly different from that of superficially similar congeners. Abaxial leaf indumentum also allowed the separation (see Thiele 2009) of the otherwise superficially similar *H. propinqua* K.R. Thiele (abaxial leaf surface sparsely simple-pubescent) from *H. fasciculiflora* K.R. Thiele (densely stellate-pubescent).

Compared with many other species of *Hibbertia*, flowering in *H. pubens* is rather sparse. While flowers are often somewhat clustered at the ends of short-shoots, they appear to open sequentially so that only a relatively small number of flowers are open at any one time, during an extended flowering period.

In the most common stamen arrangement, 24 stamens are arranged in five bundles in a pattern of 3,6,3,6,6. In bundles with three stamens, all filaments are fused as far as the anthers. In bundles with six stamens, the innermost stamen has a filament that is free almost to the base of the bundle while the remainder are fused as far as their anthers. Some flowers have reduced numbers of stamens in each bundle (e.g. 2,4,2,4,3) and lack the free inner stamen on the larger bundles, while others have supernumerary stamens (e.g. 4,7,4,7,7 or 5,9,6,9,10).

#### ***Hibbertia squarrosa* K.R. Thiele, *sp. nov.***

*Type:* Coorow-Green Head Road, 13.4 km west of the Brand Highway, Western Australia, 2 July 2016, K.R. Thiele 5323 & R. Davis (*holo:* PERTH 08812497; *iso:* AD, CANB, MEL).

*Hibbertia* sp. Geraldton Sandplains (R. Edmiston E 421), Western Australian Herbarium, in *FloraBase*, <https://florabase.dpaw.wa.gov.au/> [accessed 1 January 2018].

Erect *shrubs* 0.2–0.5 m high, single-stemmed at base; branchlets moderately pubescent with greyish, rather appressed, flexuose, tangled hairs; older stems with reddish-brown, papery bark decorticating in strips. *Leaves* spreading, scattered or ± fasciculate on short-shoots, linear to very narrowly obovate, somewhat dilated at the insertion on the stem (particularly noticeable on flower-subtending leaves), (12–)15–20(–35) mm long, (0.8–)1–2(–3) mm wide, the margins strongly recurved and usually obscuring the undersurface, the midrib abaxially not prominent; adaxial surface smooth, soon or tardily glabrescent, with sparse to moderate, pale grey to white or pale brown, flexuose, ± appressed simple hairs to 1 mm long, denser and straighter on the margins towards the leaf base; abaxial surface as for adaxial; apex obtuse. *Flowers* sessile, solitary or several together terminating short-shoots; flower-subtending bract herbaceous, linear to rectangular with an expanded base, 5–7 mm long, obtuse to subacute, often with a reduced leaf blade, with indumentum as for leaves. *Sepals* 5, broadly triangular to broadly ovate, the outer ones (and usually the inner) with a prominent, thickened, acuminate, ± stiffly recurved apex, 8–11 mm long, abaxially sparsely to moderately pubescent with silky, appressed, crisped to flexuose, white (rarely pale brown) simple hairs to 1.5 mm long, adaxially glabrous; midribs not prominent except for the thickened apex; outer sepals larger, more triangular, and more prominently apically thickened-acuminate than the inner. *Petals* 5, pale yellow, broadly obovate, 9–10 mm long, truncate to broadly emarginate. *Stamens* 20, all around the gynoecium, fused by their filaments into 5 distinct bundles of 4 stamens each, the outer 3 with filaments fused as far as the anthers, the inner one as for the outer or offset by a short, free portion of filament; filament bundles 0.5–1 mm long; anthers broadly rectangular, 1.8–2 mm long, dehiscing by introrse, longitudinal slits. *Staminodes* absent. *Carpels* 5; ovaries compressed-globular, glabrous; styles spreading excentrically from the carpel apex, 1.5–2 mm long. *Ovule* 1 per carpel. *Fruiting carpels* and seeds not seen.

*Diagnostic features.* *Hibbertia squarrosa* may be distinguished from all other Western Australian taxa by its combination of stamens in 5 bundles each of 4 stamens united by their filaments and surrounding the 5 glabrous carpels, and appressed-pubescent sepals each with a prominent, thickened, squarrose apex.

*Other specimens examined.* WESTERNAUSTRALIA: Mt Lesueur, *s. dat.*, *Anon.* (PERTH 03073254); c. 1.3 km SW of the intersection of Rocky Spring Road and Great Northern Highway [Brand Highway], Eneabba, 15 Sep. 2009, *L. Cockram* RC 076 (AD, PERTH); Cliff Head, Dongara, 20 Sep. 1973, *R. Edmiston* E 421 (PERTH); Bidgerabbie Hill SE of Dandaragan, 28 June 1988, *E.A. Griffin* 4831 (PERTH); Mt Misery, W of Dandaragan, 11 Sep. 1988, *E.A. Griffin* 5035 A (PERTH); farm E of Cataby, 15 Sep. 1988, *E.A. Griffin* 5153 (PERTH); Banovich Road 1.2 km from junction with Jurien East Road, 8 Feb. 2006, *M. Hayes* 461 (PERTH); between Eneabba and Cockleshell Gully, near Kings Homestead, 10 Nov. 1974, *R.D. Hoogland & G.L. Stebbins* 12488 (CANB, L, PERTH, UC); Coorow-Greenhead Road, 13.4 km W of junction with Brand Highway, 10 Sep. 1999, *J.W. Horn* 2368 (DUKE, PERTH).

*Phenology.* Flowers in late winter and spring, with most records from September to November (one flowering specimen collected in February, and the type collection in flower in July).

*Distribution and habitat.* Distributed between the vicinities of Dongara and Cataby in the Lesueur Sandplain sub-bioregion of the Geraldton Sandplains IBRA bioregion, mostly on the coastward side of the Brand Highway (Figure 1B). The type collection was made in a distinctive habitat, a lower slope below lateritic uplands on grey sand, with water seepage evident at the time of collection but probably summer-dry, in an open shrubland with *Allocasuarina humilis*, *Xanthorrhoea drummondii*, *Synaphaea spinulosa*, *Acacia pulchella*, *Hakea incrassata* and *Hibbertia hypericoides* subsp. *septentrionalis*. The collecting notes for three other specimens (*M. Hayes* 461, *E.A. Griffin* 5035 A, *E.A. Griffin* 5153) describe a similar soil and landform, while others mention ‘white sand’ and ‘sandy lateritic gravel,

upland<sup>?</sup>, with vegetation mostly described as kwongan heath beneath low, open *Eucalyptus todtiana* and *E. drummondii*; one specimen was collected in *E. wandoo* forest.

*Conservation status.* *Hibbertia squarrosa* is known from an area *c.* 150 × 25 km, including from nature reserves and national parks. Substantial areas of natural vegetation remain within this range, although its required habitat may not be common. While it is not currently considered to be at risk, further clearing of its habitat for mineral sand mining or agriculture could pose a future threat.

*Etymology.* The epithet is from the Latin *squarrosus* (rough with stiff scales), in reference to the characteristically relatively rigid and divergent sepals in late bud and after anthesis.

*Affinities.* *Hibbertia squarrosa* is most similar to, and is probably closely related to, *H. glabrisepala* J.R.Wheeler, sharing with that species a similar androecium and somewhat squarrose sepals; *H. glabrisepala* differs in having glabrous leaves and sepals, more distinctly widened leaf bases, and larger, more prominent and broader bracts surrounding the base of the calyx. In *H. glabrisepala* the uppermost leaves are progressively reduced, losing their lamina and widening and grading into the bracts. In *H. squarrosa* this is less obvious, and the bracts are narrower and less prominent. Leaves in *H. glabrisepala* are also usually shorter and narrower than those in *H. squarrosa*.

The northernmost specimen, *R. Edmiston* E 421, has a pale brown indumentum throughout, but is otherwise typical.

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